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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Werner Kroninger

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EXAMINER

OSELE, MARK A

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/729,882	Applicant(s) KRONINGER ET AL.	
	Examiner Mark A. Osele	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-10,14-17,19-22 and 24-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 11 is/are allowed.
- 6) ☒ Claim(s) 1-3,5-11,14-17,19-22,25 and 26 is/are rejected.
- 7) ☒ Claim(s) 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-10, 14-17, 19-22, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over De (U.S. Patent 6,470,946) in view of Buchwalter et al. (U.S. Patent Publication 2002/0078559) and Hiyamizu et al. (U.S. Patent 4,906,011). De shows the method of processing a semiconductor workpiece, 402, by adhering the workpiece in intimate contact with an adhesive, 404, to a porous work carrier, 406, (column 5, lines 46-51) having through holes, 428, thinning the workpiece (column 1, lines 26-31), and then applying solvent through the porous work carrier to dissolve the adhesive (column 5, lines 63-67; column 6, lines 24-30) and separate the workpiece from the carrier (column 6, lines 36-55). De is silent as to the exact adhesive used, but teaches that various adhesives including epoxy and tape are conventionally used to adhere a wafer to a carrier (column 1, lines 33-40). De fails to show the porous carrier to have interconnected pores.

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Hiyamizu et al. teaches the use of a porous carrier, 4, can be used with adhesive to hold a workpiece, 7, to the carrier. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the porous carrier of Hiyamizu et al. with interconnected pores as the carrier in the process of De because Hiyamizu et al. teaches the similar construction and function of a porous carrier with interconnected pores to the porous carrier of De which does not have interconnected pores.

Furthermore, Hiyamizu et al. teaches that the bond formed between a workpiece and carrier is improved if the carrier is porous because of the anchoring effect exhibited by the adhesive infiltrating in to the open pores (column 3, lines 14-26). In addition, the penetration of the adhesive into the open pores is improved by the application of vacuum. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use vacuum in addition to the adhesive as it is applied to the carrier of De because Hiyamizu et al. shows that these can be used concurrently which would increase the holding strength of the carrier to the semiconductor wafer.

Hiyamizu et al. teaches that the depth of infiltration of adhesive into the pores of a porous vacuum chuck can be controlled by selecting parameters including the type and viscosity of the adhesive (column 3, lines 26-30). The choosing of an adhesive based upon its viscosity is a clear indication that the anticipated adhesives are in liquid form. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a liquid adhesive in the method of the references as combined because De suggests that liquid adhesives are conventionally used for holding a wafer to a carrier and Hiyamizu et al. shows that liquid adhesives are used to

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hold articles to porous vacuum chucks. It is further noted that liquid thermoplastic adhesives are hardened to attach two articles together. It would have been obvious to one of ordinary skill in the art at the time the invention was made to harden the adhesive of the references as combined to complete the adhesive bond between the porous vacuum chuck and the workpiece.

Regarding the limitation that pore passages comprise at least 10% of the pore volume and wherein the pore passages traverse the porous material from a top side to a backside of the work carrier, Hiyamizu et al. teaches that the porosity and pore size of a vacuum carrier is a result effective variable for such factors as adhesive infiltration (column 3, lines 26-39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to design the carrier of the references as combined using routine optimization to determine the most effective pore size and porosity for the carrier for a given situation because Hiyamizu et al. teaches these variables to be situation specific. It is further noted that one of ordinary skill would realize that a reasonable percentage of the pore passages must traverse the porous material from a top side to a backside in order to ensure that a sufficient vacuum is pulled on the workpiece through the work carrier.

Regarding claim 5, De shows the instantly claimed features but fails to disclose of what material the porous carrier is made. It is well known that metal carriers for thinning wafers are conventional. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any conventional material, such as metal for the carrier of De because these materials are conventionally used.

Regarding claim 15, De further shows that a positive pressure can be applied on a side of the work carrier remote from the carrier (column 7, lines 28-49).

Regarding claims 16-17 and 19-22 the references as combined show the claimed limitations but fail to show the particular pore size and porosity. Hiyamizu et al. teaches that the porosity and pore size of a vacuum carrier is a result effective variable for such factors as adhesive infiltration (column 3, lines 26-39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to design the carrier of the references as combined using routine optimization to determine the most effective pore size and porosity for the carrier for a given situation because Hiyamizu et al. teaches these variables to be situation specific.

Regarding claim 25, both the work carrier and work piece of De have the same circular configuration.

Regarding claim 26, it is conventional that semiconductor work pieces have a flat section for crystal orientation. Furthermore, it is conventional to add a flat section to a workpiece carrier for alignment of the flat section on the semiconductor work piece.

Allowable Subject Matter

3. Claim 11 is allowed.
4. Claim 24 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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5. The following is a statement of reasons for the indication of allowable subject matter: None of the prior art suggests making the semiconductor work piece and porous work carrier the same size. The method of De requires the work carrier to have a larger diameter than the work piece in order for the carrier to be supported by the ledge of the wafer demount receptacle, 200. When the carrier is supported by the ledge, the work piece is free to fall from the carrier onto the floor of the wafer demount receptacle. Making the work piece and carrier with the same diameter would interfere with the delaminating process.

Response to Arguments

6. Applicant's arguments filed May 21, 2009 have been fully considered but they are not persuasive.

Regarding applicant's argument that neither De nor Hiyamizu et al. suggest or disclose a process or structure in which a liquefied adhesive is temporarily drawn into an interconnected pore network, under vacuum pressure until a solid adhesive is formed or only during an initial hardening phase of the liquefied adhesive, it is noted that the newly added claim language, "the vacuum pressure is maintained until the solid adhesive is formed or only during an initial hardening phase of the liquefied adhesive," does not add any new limitation to the claims. For example, claim 1 already includes the limitation "hardening the liquefied adhesive while maintaining the vacuum pressure to form a solid adhesive." This vacuum pressure can only be applied either "until the solid adhesive is formed" or "only during an initial hardening phase of the liquefied

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adhesive,” Because the new claim language includes either of these possibilities, rather than limiting the claim to only one of them, there is no vacuum applying permutation not covered in the amended claim.

Applicant’s arguments against the rejection of claim 11 were persuasive and the rejection against claim 11 has been rescinded.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Osele whose telephone number is 571-272-1235. The examiner can normally be reached on M-F 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark A Osele/
Primary Examiner, Art Unit 1791
August 31, 2009